

AMENDMENT UNDER 37 C.F.R. § 1.111
U. S. Application No. 09/517,589

REMARKS

Claims 1-32 are pending in the application. Applicants add new claims 33-34. Claim 24 is rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements. Claims 1, 3, 7, 18-24, 29, 30, 31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yamamoto et al. (U.S. Patent No. 5,452,312) (“Yamamoto”). Claims 2, 4-6, 8-17, and 25-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sonoda (JP 102540001) (“Sonoda”) in view of Yamamoto and Urakami et al. (U.S. Patent No. 5,317,577) (“Urakami”). Applicants add new claims 33-34 to more particularly claim the invention and to submit the following arguments to traverse the rejections.

In the rejection of claim 24 under § 112, second paragraph, the Examiner states that no structure has been recited for the laser to provide the recited limitation of “single-peak spatial mode”. To address the Examiner’s rejection, Applicants submit that one skilled in the art would easily recognize the structural elements necessary to have a single-peak spatial mode semiconductor laser and thus, such explicit recitation of the structural elements is not necessary. Furthermore, there is nothing inherently wrong with defining some part of an invention in functional terms, i.e., to define something by what it does, rather than by what it is. M.P.E.P. § 2173.05(g).

Applicants’ invention relates to a light wavelength conversion module. Applicants refer the Examiner to the description of the Applicants’ invention and the cited references in the 4 February, 2003 Amendment under 37 C.F.R. § 1.111.

Yamamoto teaches a short-wavelength laser light source having a semiconductor laser for emitting laser light. The laser light source includes a power supply for driving the

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semiconductor laser to cause the semiconductor laser to emit a fundamental wave. A polarization inversion-type light-wavelength converting device for generating from the fundamental wave a harmonic wave having a shorter wavelength than the fundamental wave is disclosed. Additionally, a laser light feedback means for feeding the light of the fundamental wave lying in a selected wavelength region back to the semiconductor laser is disclosed.

Urakami teaches an optical wavelength shifter that shifts a wavelength of light over a range without using a large peak pump pulse. A nonlinear optical medium having a nonlinear refractive index is disposed interiorly of a laser resonator and a pump pulse and a light to be modulated are incident on a nonlinear optical medium to phase shift the light. With the provision of a timing delay unit, the timing at which the light to be modulated is incident on the nonlinear optical medium is delayed with respect to the timing at which the pump pulse is incident thereon.

Rejection of claims 1, 3, 7, 18-24, 29, 30, 31 under § 102(b) over Yamamoto

Applicants respectfully submit that claim 1 is patentable because the Examiner has failed to show that Yamamoto teaches each and every element of the claims. In the Office Action, the Examiner combines the teachings of two embodiments to state that claim 1 is anticipated by Yamamoto. The Examiner refers to the fifth embodiment depicted in Fig. 9 and the seventh embodiment described in column 13, lines 45-68 to column 14, lines 1-19, as teaching all the elements of the claim. Although the fifth embodiment fails to teach or suggest the use of a light wavelength conversion element formed of a bulk-shaped wavelength conversion crystal, the Examiner refers to the seventh embodiment as teaching a bulk-type polarization inversion device. Applicants submit that such mixing and matching of components from different

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embodiments is impermissible because “[t]he elements must be arranged as required by the claim.” M.P.E.P. § 2131. The teachings of different embodiments in a single reference may not be combined absent a suggestion to do so. *In re Kramer*, 18 USPQ2d 1415, 1416 (Fed. Cir. 1991). Here, none of the embodiments taught by Yamamoto teaches the combination of elements as required in claim 1. Further, the reference merely states that “a bulk-type polarization inversion device . . . can be used as the light wavelength converting device,” in the context of the seventh embodiment. There is no teaching or suggestion whatsoever of incorporating a bulk-type device into the fifth embodiment.

For the above reasons, claim 1 is patentable. Claims 18-24, 29, 30, and 31, which depend from claim 1, are patentable for at least the reasons submitted for claim 1.

Similarly to claim 1, Applicants respectfully submit that claims 3 and 7 are patentable because the Examiner has failed to show how all the elements of Fig. 9 are arranged as required by the claim because Fig. 9 fails to teach the use of a bulk-shaped wavelength conversion crystal in the manner recited in the claim.

Rejection of claims 2, 4-6, 8-17, and 25-28 under § 103(a) over Sonoda in view of Yamamoto and Urakami

Applicants submit that claim 2 is patentable because the Examiner has not established a *prima facie* case of obviousness. In the rejection, the Examiner states that:

it would have been obvious to a person having ordinary skill in the art to use a bulk-type wavelength conversion crystal within the laser device of Sonoda as suggested and taught by Yamamoto because it would provide an efficient wavelength conversion when using a high power laser.

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To the contrary, Yamamoto teaches that a short-wavelength laser light source utilizing the bulk-type polarization inversion device “achiev[es] a conversion efficiency of 2%.” Col. 14, lines 11-12. On the other hand, Yamamoto teaches that a short-wavelength laser light source using an optical waveguide-type light-wavelength conversion device achieves conversion efficiencies ranging from 17% (Embodiment 2, col. 9, lines 24-26) to 33% (Embodiment 6, col. 13, line 19). Thus, one skilled in the art would not have utilized the bulk-type polarization inversion device as taught by Yamamoto in the laser device of Sonoda because of the low conversion efficiency conventionally associated with bulk-type polarization inversion devices when compared with optical waveguide-type conversion devices.

Further, there is no reasonable expectation of success in the modification of Sonoda with Yamamoto in the manner suggested by the Examiner. *See* M.P.E.P. § 2143.02. As was extensively discussed in prior submissions of the Applicants, Sonoda teaches the use of waveguide-type wavelength conversion element. In all the figures of Sonoda, the laser light inputted into the conversion element is tightly converged to a single point whereas the bulk-type polarization inversion device taught by Yamamoto does not receive such a tightly focused beam (Fig. 16). A narrow beam inputted into a bulk-shaped wavelength conversion crystal diffuses drastically as the beam is propagated and the conversion efficiency decreases. Thus, one skilled in the art would not have modified the device taught by Sonoda with the bulk-type polarization inversion device taught by Yamamoto due to the incompatible optical geometries of the laser light as inputted into the respective wavelength conversion devices and the reduction of conversion efficiency if such modification was made. Thus, there is no reasonable expectation of success in the modifying Sonoda with Yamamoto as suggested by the Examiner.

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Claim 14, which depends from claim 2, is patentable for at least the reasons submitted for claim 2.

Similarly, claims 4-6, 8-17, and 25-27 are patentable for at least the reasons submitted for claim 2, that the references fail to teach, suggest, or provide motivation for the modifying Sonoda with the bulk-type light wavelength conversion device 22 taught by Yamamoto.

Claim 28 is patentable because the Examiner has failed to satisfy the required showing that “all the claim limitations must be taught or suggested by the prior art.” M.P.E.P. § 2143.03. Applicants request the Examiner to provide references which teach or suggest the claim limitations. Although Yamamoto suggests optical information processing, nowhere in Yamamoto is there any suggestion or motivation for a light scanning and recording apparatus comprising the recited elements of claim 28.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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